BLM LIBRARY
88069918

RESEARCH STUDIES AND PUBLICATIONS OF THE COASTAL OREGON PRODUCTIVITY ENHANCEMENT (COPE) PROGRAM FY 1987 - FY 1991

COPE
COASTAL OREGON PRODUCTIVITY ENHANCEMENT

Compiled by

Tom McMahon
Gabriel Tucker
Skye Etessami

QH
541.5
.C65
C67
1991

College of Forestry
Forest Research Laboratory
Oregon State University

United States Department of the Interior
Bureau of Land Management

Pacific Northwest
Research Station

COPE ADVISORY COUNCIL MEMBERS (1987-1991)
(Association at Time of Membership)

Mel Berg
Bureau of Land Management

Mike Beyerle
Oregon Dept. of Forestry

John Byrne
U.S. Fish & Wildlife

Mel Chase, District
Manager, Bureau of
Land Management

John Christie
Oregon Small Woodlands
Association

Ray Craig
Oregon Dept. of Forestry

Gerald Creasy,
Commissioner,
Tillamook County

Dennis Creel
Willamina Lumber Co.

Don Davis, City Mgr.
Newport

Ellie Dumdi, Commissioner
Lane County

J.W. (Bud) Forrester
Astorian Publishing Co.

Steve Forrester
Astorian Publishing Co.

John C. Hampton, President
Willamina Lumber Co.

Craig Hanneman,
Commissioner Polk County

Fred Hansen, Director
Department of Environmental
Quality

Wendy Herrett, Forest
Supervisor, Siuslaw National
Forest

Ida Lane, Commissioner
Tillamook County

Nancy MacHugh
Oregon Dept. of Fish
and Wildlife

Dick Mathews
Oregon Dept. of Land
Conservation & Development

Dan McKeel
Lincoln City

Joyce Morgan, Commissioner
Douglas County

Mike Propes, Commissioner,
Polk Co

John N. Purcell,
Vice President
Weyerhaeuser Company

Jay Rasmussen
Oregon Coastal Zone
Management Association

Tom Robinson, Administrator,
Oregon Salmon Commission

Rollie Rousseau
Oregon Dept. of Fish &
Wildlife

Gerald H. Rust,
Commissioner, Lane County

Harold Sawyer
Department of Environmental
Quality

Darrell Schroeder, President,
Stimson
Lumber Company

Tom Shoemaker, Regional
Representative, National
Audobon Society

Barte Starker,
Advisory Council Chair
Starker Forests, Incorporated

Dave Talbot, Director
Oregon State Parks

Tom L. Thompson,
Forest Supervisor,
Siuslaw National Forest

Al Tocchini, Parks Forester,
Oregon State Parks

Merritt Tuttle
National Marine
Fisheries Service

Gary Varner
Bureau of Indian Affairs

Bill Vian, Commissioner
Douglas County

John Wilkinson,
Vice President
Weyerhaeuser Company

Einar Wold
National Marine Fisheries

BUREAU OF LAND MANAGEMENT LIBRARY
BLDG. 50,
DENVER FEDERAL CENTER
P.O. BOX 25047
DENVER, COLORADO 80225

#52441957 ID 88069918 QH 541.5 .C65 C67 1991

ABOUT THE COPE PROGRAM

The Coastal Oregon Productivity Enhancement (**COPE**) Program is a cooperative research and education effort designed to enhance the productivity of Oregon Coast Range resources. The Coast Range contains some of the most productive forests and streams in North America; these same lands support highly prized sport and commercial fisheries, abundant wildlife, and timber. They also provide drinking water for many communities and recreational opportunities.

In recent years, a number of issues have fueled controversy over resource management policies and practices in the Coast Range; these include the withdrawal of federal lands from the timber base, declining fish runs, increasing public concern for nongame wildlife, community instability, controversy over Oregon's new forest practice regulations, and restrictions on traditional reforestation methods that use controlled fire and herbicides.

These issues illustrated the need for better information on managing diverse Oregon Coast Range resources, and emphasized the need for effective information exchange among researchers, managers, and the public. The **COPE** program combines research and education to solve complex resource management questions to ensure that information is quickly and widely disseminated. This effort will have the added long-term benefit of improving understanding between groups with different management perspectives on resource issues by providing new information.

Jointly administered by the Oregon State University College of Forestry, and the USDA Forest Service PNW Corvallis Pacific Northwest Research Station (PNW), **COPE** has been supported during the last five years by funds from 53 different organizations, (see inside front cover). The program was initiated in 1987 and is scheduled to be completed in 1998.

THE RESEARCH FOCUS

COPE research is concentrated on two management questions: riparian zone management and reforestation.

Although riparian areas are only a small part of the total land base, unique ecological characteristics provide important habitat for fish, wildlife, vegetation, and timber. Riparian area research in **COPE** focuses on ways to actively manage riparian zones for multiple resources. Scientists are studying riparian wildlife habitat relationships, causes and prevention of landslides and their downstream effects, large woody debris in streams as fish habitat, riparian silviculture, and costs and benefits of various riparian management practices.

Although fertile soils and abundant rainfall result in highly productive forests, reforestation is sometimes difficult because of vegetative competition and increasing restrictions on traditional vegetation management tools. **COPE** reforestation scientists are

developing and evaluating: alternative reforestation methods in lieu of fire and herbicides, more efficient ways to use existing tools, and ways to identify and control root rot diseases.

In addition to specific riparian zone and reforestation studies, interdisciplinary studies of geomorphology, vegetation, fish, and wildlife across entire drainage basins are part of **COPE** research. **COPE** scientists are also conducting economic and recreation research. Geographic Information Systems and simulation models will be developed to help land managers identify trade-offs of various resource management strategies.

THE COPE ORGANIZATION

COPE has two interrelated components: Fundamental **COPE** and Adaptive **COPE**.

Fundamental **COPE** is comprised of over 45 scientists, mainly from OSU and PNW in Corvallis, who conduct basic and applied research on riparian zone management and reforestation questions.

Adaptive **COPE** is an interdisciplinary team (hydrology/soils, fisheries, silviculture, and wildlife) of OSU College of Forestry scientists. Stationed on the coast in Newport at the Hatfield Marine Science Center, Adaptive **COPE** conducts applied research and has the primary responsibility for providing resource managers with continuing education opportunities through newsletters, workshops, technical publications and other media, field tours, and consultations. County forestry extension agents located throughout the 13-county area also help in transferring information throughout the region.

An Advisory Council (see inside of back cover), comprised of representatives from the various cooperating organizations supporting the **COPE** program, provides policy guidance on budgeting, planning, and the direction of research and education efforts. Cooperating organizations provide approximately $2.7 million per year in financial support for the **COPE** program.

For additional information, write or call the **COPE** Program at:

Forestry Sciences Laboratory
3200 SW Jefferson Way
Corvallis, OR 97331
(503) 750-7426

Hatfield Marine Science Center
Oregon State University
2030 S. Marine Science Drive
Newport, OR 97365
(503) 867-0220

INTRODUCTION

The purpose of this publication is to provide **COPE** cooperators with information on all Fundamental and Adaptive **COPE** projects both past and present. An inventory of projects is presented under the broad headings of Riparian Zone Management and Reforestation in the Oregon Coast Range. We have also listed new studies started in Fiscal Year 1992. Each project is briefly outlined, including project title, principal investigators, project objectives, initiation and completion dates, publications to date, and **COPE** Report Articles. Those interested in further information on these projects, should contact the principal investigators directly.

The **COPE** program has grown substantially since its beginning in 1987. Currently, there are 51 research projects involving scientists from many different organizations. While some projects have been completed, others are just being started. Tp increase the awareness of the informational products from this program as a whole, this publication should prove useful for cooperators, scientists, and the public.

Acknowledgements:

We appreciate the editorial comments and direction received from Stephen Hobbs, COPE Program Manager, on the production of this publication. We also wish to thank each of the program's principal investigators who provided important input on each of their respective projects.

TABLE OF CONTENTS

COPE RESEARCH: RIPARIAN ZONE MANAGEMENT

COMPLETED STUDIES

Evaluating the Socio-Economic Ramifications of Alternative Forest Resource Management Options in Coastal Oregon 1

Cost of Producing Additional Non-Timber Outputs From Riparian Zones 2

Juvenile Salmonid Macrodistribution and Habitat Availability in a Small Coastal Oregon Stream: A Basin-Wide Seasonal Perspective 3

Influence of Geology on Response of Channel Morphology and Juvenile Salmonid Populations to Logging in Streams of the Oregon Coast Range 4

CONTINUING STUDIES

Ecology and Inventory of Riparian Zone Vegetation 5

Fish Habitat and Riparian Zone Interactions 6

Forest Management on Landslide-Prone Sites: Stability Evaluation, Effectiveness of Leave Areas, and Effects of Landslides on Riparian and Fisheries Resources 7

Wildlife Habitat and Wildlife Diversity in Riparian Zones: A Gradient Approach 8

Hybrid Poplar and Red Alder in Coastal Riparian Zones for Non-Point Source Pollution Control, Fish and Wildlife Habitat, and Wood Fiber 9

Ground Water Movement in Steep Forested Hill-slopes with Particular Focus on Marginal Stable "Head-walls" 10

Integration of COPE Drainage Basin Studies 10

The Dynamics and Silviculture of Riparian Vegetation 11

Disturbance History, Channel State, Fish Habitat, and Fish Production in Sandstone Basins of the Central Oregon Coast 12

. . . . . COPE RESEARCH: RIPARIAN ZONE MANAGEMENT (continued)

Behavior of Debris Torrents and Effects on Anadromous Fish Habitat in the Oregon Coast Range 13

Estimation of Smolt Production from Drift Creek Study Basin 13

Modeling Root Reinforcement in Shallow Forest Soils 14

Ecology and Habitat Relationships of Selected Riparian-Associated Wildlife 15

The Role and Management of Large Woody Debris for Fish Habitat in Coast Range Streams 15

Establishment and Growth of Conifers Under Existing Riparian Vegetation 16

Active Management of Riparian Zones for Multiple Resources: I. An Integrated Approach 17

Active Management of Riparian Zones for Multiple Resources: II. Release of Suppressed and Intermediate Conifers in Alder-Dominated Riparian Zones of the Oregon Coast Range 18

Active Management of Riparian Zones for Multiple Resources: III. Influence of Woody Debris Piece Size on Function in Small Streams 18

Stability Assessment of End-Haul Disposal Areas 19

REFORESTATION IN THE OREGON COAST RANGE

COMPLETED STUDIES

Prescribed Fire in Pacific Northwest Forests: An Analysis 21

The Effect of Slash Burning on the Number and Distribution of Planting Spots and Planting Productivity on Sites in the Oregon Coast Range 21

. . . . . **REFORESTATION IN THE OREGON COAST RANGE (continued)**

Reducing Air Pollution From Hardwood Conversion Burning in Coastal Oregon 22

A Diagnostic Tool for Predicting the Effects of Interspecific Competition on Growth and Yield of Douglas-Fir 23

Environment and the Natural Regeneration of Conifers 24

Effects of Time of Manual Cutting on Resprouting of Salmonberry 25

CONTINUING STUDIES

Ecology and Management of Shrubs and Hardwoods in Coastal Forests 27

Characterization of the Thermal Environment for Developing Guidelines to Manage Shrubs and Hardwoods in Coastal Forests 28

Second Decade Effects of Site Preparation on Tree and Vegetation Development With and Without Precommercial Thinning 28

Species Manipulation as a Strategy to Reduce the Impact of Laminated Root Rot in Regenerated Coastal Stands 29

Asymbiotic Nitrogen Fixation in Large Woody Residues of Oregon Coastal Forests 30

Characterization of Trichoderma spp.: Prelude to Biological Control 30

Rate of Spread of Phellinus weirii in Living vs Dead Root Systems 31

Chemical Control of Phellinus (Poria) weirii Part III-- Application of Chloropicrin or Methyl Isothiocyanate 31

The Influence of Tree Vigor on Infestation of Douglas-fir by Phellinus weirii 32

Identification of Potential Brush and Hardwood Problem Sites 32

A Synthesis of Reforestation Practices with Constraints on Fire and Herbicides 33

. . . . . REFORESTATION IN THE OREGON COAST RANGE (continued)

Patterns of Wildlife Abundance and Diversity in Managed Upland Forest Landscapes 34

Adaptation of a Forest Succession and Wildlife Habitat Model to Managed Coast Range Forests 35

Effects of Forage Seeding on Establishment and Growth of Douglas-fir Seedlings 36

NEW RESEARCH INITIATED IN FY 1992

The Utilization of Unconstrained Stream Reaches by Salmonids in the Oregon Coast Range 37

Evaluation of Anadromous Salmonid Habitat Restoration Program on Schooner Creek, Hebo Ranger District, Siuslaw National Forest 37

Harvesting in Headwater Basins for Alternative Silvicultural Prescriptions 38

Strength Behavior of Forest Soils Under True Field Stresses 38

Integrating and Managing Recreation with Other Resources 39

Socioeconomic Research Feasibility Study 39

Decision Support System for Reforestation in the Oregon Coast Range 40

Interdisciplinary Research and Demonstration Area Project (IRDAP) 40

COPE RESEARCH:

RIPARIAN

ZONE

MANAGEMENT

Completed Studies

Evaluating the Socio-Economic Ramifications of Alternative Forest Resource Management Options in Coastal Oregon

(D. Brodie, B. Greber, OSU Forest Resources, & R. Haynes, PNW Portland)

Study Objectives

- To enable the translation of alternative levels of resource outputs into community impacts by permitting the assessment of the implied changes in employment, income, occupational makeup, demographic characteristics, and county revenues and expenditures.
- To integrate the results of this study with the results of other **COPE** research, in order to fully assess the implications of management options proposed for coastal Oregon.

Project Status

Initiation date: FY 87
Completion date: FY 91

PUBLICATIONS

Hackworth, K. & B.J. Greber. 1988. Timber derived revenues: Importance to local governments in Oregon (Fiscal Years 1982-3 through 1986-7). Oregon State University. Corvallis, OR: Forest Research Laboratory: Research Special Publication 17. 70 p.

Powell, L.A. 1991. Federal forest revenue-sharing in coastal Oregon: An assessment of historic and future tax equivalents. M.S. thesis, Dept. of Forest Resources, Oregon State University, Corvallis. 120 p.

COPE REPORT ARTICLES

Brodie, J.D. 1989. Producing timber and non-timber outputs through forest land and riparian zone planning. **COPE** Report 2(1):4-5

<<< >>>

Cost of Producing Additional Non-Timber Outputs From Riparian Zones

(D. Brodie, OSU Forest Resources)

Study Objectives

- Determine least cost way to increase the production of various non-timber outputs from a range of riparian sites and management options.
- Compare multiple use policies applied to sites to see if the implied values of non-timber outputs vary widely from site to site.

Project Status

Initiation date: FY 87
Completion date: FY 90

PUBLICATIONS

Paredes, G.L. 1988. Design of a resource allocation mechanism for multiple use forest planning. In: Proc. Systems Analysis in Forest Resources Symposium. Gen. Tech. Rep. RM-161. Ogden, UT: PNW Corvallis, Rocky Mountain Forest and Range Experiment Station. pp 35-45.

Paredes, G.L. 1988. Multiple resource planning: spatial considerations with application to riparian zones. Ph.D. Dissertation. Corvallis, OR: College of Forestry, Oregon State University. 143 p.

Paredes, G.L. & J.D. Brodie. 1988. Activity analysis in forest planning. Forest Science 34(1):3-18.

Paredes, G.L. & J.D. Brodie. 1989. Land value and the linkage between stand and forest level analyses. Land Economics 65(2):158-166.

Torres, J. 1990. The use of relaxation to solve harvest scheduling problems with flow, wildlife habitat and adjacency constraints. Ph.D. Dissertation. Corvallis, OR: Dept. of Forest Resources, Oregon State University. 182 p.

Torres, J.M. & J.D. Brodie. 1990. Adjacency constraints in harvest scheduling: an aggregation heuristic. Canadian Journal of Forest Research 20(7):978-986.

Torres, J.M., J.D. Brodie, & J. Sessions. Solution to the area based harvest scheduling problem through Lagrangean relaxation. Submitted/being revised. DRAFT.

Torres, J.M., J.D. Brodie, & J. Sessions. The use of relaxation to solve the habitat dispersion problem. Submitted. DRAFT.

Yoshimoto, A. 1991. Economic analysis of integrating spatial concerns into harvest scheduling. Ph.D. Dissertation. Corvallis, OR: Dept. of Forest Resources, Oregon State University. 188 p.

Yoshimoto, A., J.D. Brodie, & J.M. Torres. 1990. A comparison of approaches for integrating spatial concerns into harvest scheduling. Submitted. DRAFT.

Yoshimoto, A. & J.D. Brodie. 1990. Cost evaluation of implementing spatial restrictions on riparian zone planning in western Oregon. To be submitted. DRAFT.

Yoshimoto, A., J.D. Brodie, & G.L. Paredes. 1988. Efficient optimization of an individual tree growth model. In: Proceedings, Systems Analysis in Forest Resources Symposium: PNW Corvallis, Gen. Tech. Rep. RM-161: 154-162.

Yoshimoto, A., R.G. Haight, & J.D. Brodie. 1990. A comparison of the pattern search algorithm and the modified PATH algorithm for optimizing an individual tree model. Forest Science, 34(2) 394-412.

COPE REPORT ARTICLES

Brodie, J.D. 1989. Producing timber and non-timber outputs through forest land and riparian zone planning. **COPE** Report 2(1):4-5.

Brodie, J.D. 1991. Spatial aspects of riparian and landscape management on commercial forest land in the coastal region. **COPE** Report 4(2):9-10.

Juvenile Salmonid Macrodistribution and Habitat Availability in a Small Coastal Oregon Stream: A Basin-Wide Seasonal Perspective

(F. Everest, G. Reeves, J. Sedell, PNW Corvallis,
S. Gregory, & J. Sleeper, OSU Fisheries & Wildlife)

Study Objectives

- Determine if basin-wide distribution and abundance of juvenile anadromous salmonids in habitat units (pools, riffles, glides, side channels) vary seasonally and longitudinally, and quantify the associated seasonal relationships between juvenile salmonids and habitat characteristics.
- Relate longitudinal and seasonal juvenile anadromous salmonid habitat use, and possible changes in habitat use, to the identification of characteristics of critical fish habitat and to the development and design of habitat rehabilitation programs.

Project Status

Initiation date:	FY 90
Scheduled completion date:	FY 91

PUBLICATIONS None

COPE REPORT ARTICLES

Reeves, G.H. 1988. Distribution patterns of fish in the Elk River Basin. **COPE** Report 1(3):4-6.

Influence of Geology on Response of Channel Morphology and Juvenile Salmonid Populations to Logging in Streams of the Oregon Coast Range

(F. Everest, G. Reeves, J. Sedell, PNW Corvallis,
B. Hicks, OSU Civil Engineering, & J. Hall OSU Fisheries & Wildlife)

Study Objectives

- Determine the response of channel morphology to timber harvest and road construction by comparison of streams with similar underlying rock types in largely unharvested and harvested watersheds in the Oregon Coast Range.
- Describe key basin-scale geomorphic characteristics of watersheds in different rock types to determine the effect of rock type on basin topography.
- Determine channel unit and subunit characteristics such as gradient, width, depth, substrate size, habitat complexity, and the proportion of different channel units at similar sites in streams running through different rock types.
- Determine the extent to which the abundance of salmonids is associated with different channel morphology in harvested and unharvested watersheds in different rock types.

Project Status

Initiation date: FY 90
Completion date: FY 91

PUBLICATIONS

None

COPE REPORT ARTICLES

Reeves, G.H. 1988. Distribution patterns of fish in the Elk River Basin. **COPE** Report 1(3):4-6.

COPE RESEARCH:

RIPARIAN

ZONE

MANAGEMENT

Continuing Studies

Ecology and Inventory of Riparian Zone Vegetation

(T. Spies, J. Sedell, PNW Corvallis,
& J. Tappeiner, OSU Forest Resources)

Study Objectives

- Conduct an inventory of major vegetation types for representative subbasins within three Oregon Coast Range basins using photogrammetric and remote sensing techniques.
- Characterize existing riparian vegetation structure and spatial distribution within representative basins according to stream size, valley width and gradient, geomorphology and other factors.
- Characterize vegetation and large woody debris dynamics in streamside forests.
- Determine response of streamside vegetation to flooding, mass movement, and other natural disturbances.

Project Status

Initiation date:	FY 87
Scheduled completion date	FY 96

PUBLICATIONS

Farnsworth, B. 1989. Overcoming the obstacles of effective photogrammetric mensuration. M.F. Thesis. Corvallis, Oregon: Oregon State University. 72 p.

Pabst, R.V. & T.A. Spies. Plant community characteristics of riparian forests in the Coast Range of Oregon. In Preparation.

COPE REPORT ARTICLES

Paine, D.P. & J. Kiser. 1988. Vegetation mapping and inventory of coastal riparian zones. **COPE** Report 1(1):8-9.

Spies, T.A., R. Pabst, & J. Tappeiner. 1991. Vegetation patterns in riparian forests. **COPE** Report 3(4): pp 7-10.

«<< >>>

Fish Habitat and Riparian Zone Interactions

(S. Gregory, G. Lamberti, & J. Hall, OSU Fisheries & Wildlife, B. Beschta, OSU Forest Engineering, F. Everest, G. Reeves, J. Sedell, & F. Swanson, PNW Corvallis)

Study Objectives

- To describe relationships between riparian zones and critical fish habitat and to provide a foundation for basin-wide fisheries management.
- To describe relationships between the distribution and abundance of salmonids and the geomorphic characteristics of basin landforms as a foundation for managing fisheries resources within entire drainage basins.
- To describe the influence of riparian zone composition and structure on the distribution and abundance of salmonids.
- To identify management strategies for maintaining riparian characteristics critical for salmonid populations in coastal basins.
- To evaluate practices for mitigating loss of riparian resources or habitat for fisheries of coastal drainages. (This objective will be developed in future years as a basin context is developed for interpretation.)

Project Status

Initiation date: FY 87
Scheduled completion date: FY 96

PUBLICATIONS

Schwartz, J. & S. Gregory. Influence of land use practices on abundance of salmonid populations: a retrospective of the Alsea watershed study. In preparation.

Schwartz, J. & S. Gregory. Influence of landforms and channel geomorphology on distribution and abundance of salmonids in the Drift Creek Basin. In preparation. DRAFT.

Veldhusen, C. & B. Beschta. Patterns of large woody debris in streams of the Drift Creek Basin. DRAFT.

COPE REPORT ARTICLES

Beschta, R. & C. Veldhusen. 1991. Forest harvesting and coarse woody debris in the Central Oregon Coast range. **COPE** Report 4(2)6-9.

Gregory, S. V., B. Beschta, F. Swanson, J. Sedell, G. Reeves, & F. Everest. 1990. Abundance of conifers in Oregon's riparian forests. **COPE** Report 3(2):5-6.

<<< >>>

Forest Management on Landslide-Prone Sites: Stability Evaluation, Effectiveness of Leave Areas, and Effects of Landslides on Riparian and Fisheries Resources

(H. Froehlich, K. Lautz, OSU Forest Engineering,
& F. Swanson, PNW Corvallis)

Study Objectives

- Compare and evaluate existing approaches to judging the stability of head walls. If existing approaches prove to be inadequate, develop an improved method of evaluating headwall stability appropriate for field use.
- Evaluate the role tree roots play in mitigating landslide activity within steep headwalls.
- Determine where streamside buffer blowdown is likely to occur and if stream sediment levels significantly increase when wide-spread blowdown does occur.
- Characterize the timing and rate of movement of large-scale landslides. Evaluate the effects of forest cutting on movement.
- Examine variations in precipitation intensity and amounts throughout the Coast Range. Relate rainfall characteristics to landslide activity.

Project Status

Initiation date:	FY 88
Scheduled completion date:	FY 96

PUBLICATIONS

Andrus, C.W. & H.A. Froehlich. 1990. Wind damage within streamside buffers and its effect on accelerated sedimentation in coastal Oregon streams. North American Journal of Fisheries Management. DRAFT submitted.

COPE REPORT ARTICLES

Andrus, C.W. & H.A. Froehlich. 1988. Unearthing ties between vegetation and landslides. **COPE** Report 1(1):6-8.

Andrus, C.W. & H.A. Froehlich. 1989. Blowdown of streamside buffers. **COPE** Report 2(1):5-6.

Andrus, C. 1990. Summary of precipitation data for the second half of the 1989 water year. **COPE** Report 3(1):8.

Lautz, K. 1991. Summary of precipitation data for April-November 1990. **COPE** Report 4(1):10,11.

Lautz, K. 1991. Summary of precipitation for the first half of the 1991 water year. **COPE** Report 4(3):8.

<<< >>>

Wildlife Habitat and Wildlife Diversity in Riparian Zones: A Gradient Approach

(B. McComb, OSU Forest Science, B. Anthony, C. Meslow, OSU Fisheries & Wildlife, & J. Beatty, OSU Biological Sciences)

Study Objectives

- Determine the relative abundance of vertebrate species and quantify patterns of vertebrate community structure and diversity along transriparian and intrariparian gradients in Coast Range watersheds.
- Quantify food and cover along transriparian and intrariparian gradients in a representative set of Coast Range watersheds.
- Assess habitat associations and the zone of riparian influence for selected species that may be sensitive to riparian zone disturbance.
- Extensively sample habitat and vertebrate communities at sites throughout the Coast Range that represent a continuum of habitat conditions.
- Develop and test hypotheses regarding the response of species and communities to changes in vegetation structure and composition within and adjacent to riparian zones.
- Evaluate opportunities to manipulate vegetation to optimize simultaneous production of wildlife habitat and timber.

Project Status

Initiation date:	FY 88
Scheduled completion date:	FY 96

PUBLICATIONS

McComb, W.C., R.G. Anthony, & K. McGarigal. 1991. Differential vulnerability of small mammals and amphibians to two trap types and two trap baits. Northwest Science. 65: p. 109-115.

McComb, W.C., K. McGarigal, & R.G. Anthony. Small mammal and amphibian abundance in riparian and upslope habitats of mature Douglas-fir stands, eastern Oregon. Northwest Science. Submitted. DRAFT.

McGarigal, K. & W.C. McComb. 1988. Problem analysis on riparian wildlife relationships in the Oregon Coast Range. Oregon State University, Corvallis, OR: Forest Research Laboratory. Unnumbered report. 106 p.

McGarigal, K. & W.C. McComb. 1989. Riparian wildlife information needs in western Oregon: land manager concerns. Trans. North American Wildlife and Natural Resources Conference: 54: p.32-42.

McGarigal, K. & W.C. McComb. 1991. Streamside versus upslope bird communities in the central Oregon Coast Range. Journal of Wildlife Management. In Press.

COPE REPORT ARTICLES

McComb, W.C. & K. McGarigal. 1988. Wildlife use of riparian zones in Coast Range forests. **COPE** Report 1(2):2-3.

McGarigal, K. & W.C. McComb. 1989. Providing pertinent riparian wildlife information - we'll try! **COPE** Report 2(4):5-7.

Gomez, D. & R.G. Anthony. 1990. Influences of riparian vegetation on small mammal, amphibian and reptile communities. **COPE** Report 3(4):4-6.

Hybrid Poplar and Red Alder in Coastal Riparian Zones for Non-Point Source Pollution Control, Fish and Wildlife Habitat, and Wood Fiber

(J. Sedell, PNW Corvallis, B. Emmingham, D. Hibbs, OSU Forest Science, & S. Gregory, OSU Fisheries & Wildlife)

Study Objectives

- Monitor and measure the development of hybrid poplar and red alder established in riparian zones of streams adjacent to farm or pasture land in the Oregon Coast Range.
- Monitor concentrations of nitrates at three depths in the soil profile across the transect of each poplar and alder buffer strip.
- Monitor changes in bank stability and fish habitat complexity as hybrid poplar and alder stands develop.

Project Status

Initiation date:	FY 89
Scheduled completion date:	FY 96

PUBLICATIONS None

COPE REPORT ARTICLES None

Ground Water Movement in Steep Forested Hill-slopes with Particular Focus on Marginal Stable "Head-walls"

(M. Pyles, H. Froehlich, OSU Forest Engineering,
& A. Skaugset, OSU Adaptive **COPE**)

Study Objectives

- Review published analytical modeling methods for applicability to steep forest slope groundwater regimes.
- Attempt measurements of the distribution of groundwater flow in a steep forested slope between saturated flow, unsaturated flow, and macro-pore or pipe flow.
- Estimate hydraulic constraints for groundwater flow in steep forest slopes.

Project Status

Initiation date:	FY 90
Scheduled completion date:	FY 94

PUBLICATIONS None

COPE REPORT ARTICLES None

Integration of COPE Drainage Basin Studies

(J. Means, G. Grant, G. Reeves, T. Spies, F. Swanson, PNW Corvallis,
B. Beschta, OSU Forest Engineering, S. Gregory, OSU Fisheries & Wildlife,
B. McComb, OSU Forest Science, A. Hansen & T. McMahon, OSU Adaptive **COPE**)

Study Objectives

- Coordinate and facilitate interaction among the fisheries, riparian vegetation, wildlife, and geomorphology/landslide studies of **COPE** with regard to conceptual approach, sampling, and data management in order to increase integration of research at the drainage basin scale.
- Characterize drainage basin structure, such as drainage network and valley floor geomorphology, in order to facilitate sampling and interpreting distributions of wildlife, fish, and vegetation in the basins.
- Examine selected patterns of association among fish, vegetation, wildlife and geomorphology, and interpret controls on productivity of fish, wood, and wildlife.

Project Status

Initiation date:	FY 90
Scheduled completion date:	FY 96

PUBLICATIONS

Ryan, S.E. & G.E. Grant. 1991. Downstream effects of timber harvesting on channel morphology in Elk River Basin, Oregon. Journal of Environmental Quality 20(1):60-72.

COPE REPORT ARTICLES

Means, J., F. Swanson, & A. Hansen. 1990. Integration of **COPE** drainage basin studies. **COPE** Report 3(3):5-7.

The Dynamics and Silviculture of Riparian Vegetation

(D. Hibbs, B. Emmingham, OSU Forest Science,
J. Tappeiner, OSU Forest Resources, & S. Chan, PNW Corvallis)

Study Objectives

- Determine the effects of harvest entry type and intensity, landform, vegetation type, upslope activity, and time since entry on tree regeneration, understory development, and overstory dynamics (succession, mortality, windthrow, diversity) by sampling the spectrum of existing buffer strip conditions.
- Develop systems of tree regeneration in riparian areas and descriptions of (1) how these systems affect fish and wildlife habitat characteristics and growing conditions, and (2) how these regeneration systems can be integrated into adjacent upslope management.
- Develop the information base and methodology required to manage the riparian overstory to maintain or achieve a desired plant composition and structure through manipulation of mixes of tree and shrub species in groups of different sizes and at different densities.

Two guidelines apply to all study objectives:

1) The spectrum of riparian area activities studied will range from no disturbance, through partial overstory removals, to complete harvest and will include intensive regeneration and stand management practices.
2) All characterizations of vegetation and the effects of manipulations on vegetation will be measured and described in terms useful to fisheries, wildlife and timber resource managers.

Project Status

Initiation date:	FY 90
Scheduled completion date:	FY 96

PUBLICATIONS

McConnell, S.P., S.S. Chan, P.A. Giordano, D.E. Hibbs, R.A. Pabst, & T.A. Spies. 1991. **COPE** riparian studies. Poster presentation with abstract. IN: Proceedings of the SAF National Convention. San Francisco, CA. August 4-7.

COPE REPORT ARTICLES

Hibbs, D.E., P. Giordano, & S. Chan. 1990. Managing riparian vegetation. **COPE** Report 3(3):7-8.

Giordano, P., D.E. Hibbs, & S. Chan. 1991. Vegetation dynamics in managed coastal riparian areas. **COPE** Report 4(4):3-5.

Disturbance History, Channel State, Fish Habitat, and Fish Production in Sandstone Basins of the Central Oregon Coast

(F. Everest, G. Reeves, J. Sedell, PNW Corvallis,
& L. Benda, University of Washington)

Study Objectives

Establish the spatial and temporal relationship between natural and human disturbances in central coast sandstone basins and successional state of riparian vegetation, stream channel state, fish habitat characteristics, and fish populations and community structure.

Project Status

Initiation date: FY 90
Scheduled completion date: FY 92

PUBLICATIONS

Benda, L. In press. The influence of debris flows on channels and valley floors in the Oregon Coast Range. In: U.S.A. Earth Surface Processes and Landforms.

COPE REPORT ARTICLES None

Behavior of Debris Torrents and Effects on Anadromous Fish Habitat in the Oregon Coast Range

(F. Everest, G. Reeves, J. Sedell, PNW Corvallis,
& L. Benda, University of Washington)

Study Objectives

- Determine the cause, frequency, behavior, and spatial and temporal distribution of debris torrents in sandstone and basalt geologies of the Oregon Coast Range.
- Determine the spatial and temporal effects of debris flows on the physical structure of habitat for anadromous salmonids in streams draining sandstone and basalt geologies of the Oregon Coast Range.

Project Status

Initiation date: FY 90
Scheduled completion date: FY 94

PUBLICATIONS

Benda, L. In press. The influence of debris flows on channels and valley floors in the Oregon Coast Range. In: U.S. A. Earth Surface Processes and Landforms.

COPE REPORT ARTICLES

Reeves, G.H. 1988. Distribution patterns of fish in the Elk River Basin. **COPE** Report 1(3):4-6.

Estimation of Smolt Production from Drift Creek Study Basin

(F. Everest, G. Reeves, & J. Sedell, PNW Corvallis,
& S. Gregory, OSU Fisheries & Wildlife)

Study Objectives

- Quantify salmonid smolt (juvenile migrants physiologically adapted for ocean existence) production from the Drift Creek basin, including numbers, size, community structure, and timing of migration.
- Relate production and behavior of smolts to land use activities in riparian and upland areas of the basin.

Project Status

Initiation date: FY 90
Scheduled completion date: FY 94

PUBLICATIONS None

COPE REPORT ARTICLES

Reeves, G.H. 1988. Distribution patterns of fish in the Elk River Basin. **COPE** Report 1(3):4-6.

Modeling Root Reinforcement in Shallow Forest Soils

(A. Skaugset, OSU Adaptive **COPE**, & M. Pyles, OSU Forest Engineering)

Study Objectives

- Develop an analytical model of the root reinforcement mechanism.
- Determine the relationship between soil strain and rupture for a continuum of simulated root biomasses using a physical model.
- Verify model results using the physical model.

Project Status

Initiation date: FY 89
Scheduled completion date: FY 93

PUBLICATIONS

Donahue, J.P. & A.E. Skaugset. 1990. Close-range target positioning using an exponential range function. In: Proceedings of the ACSM-ASPRS Annual Convention; March 18-23, 1990; Denver, CO 5:8-17.

Donahue, J.P., A.E. Skaugset, & M.R. Pyles. In preparation. Tracking close-range target location using digital image analysis. DRAFT.

COPE REPORT ARTICLES

Skaugset, A. 1989. Root reinforcement in shallow forest soils: Development of a model. **COPE** Report 2(2):4-6.

Skaugset, A. & J. Donahue. 1990. Testing a root reinforcement model. **COPE** Report 3(1):2-4

Ecology and Habitat Relationships of Selected Riparian-Associated Wildlife

(R. Anthony, OSU Fisheries & Wildlife)

Study Objectives

- Describe movements and habitat relationships of selected riparian-associated wildlife.
- Describe diets and reproductive fitness of selected riparian-associated wildlife.
- Identify the important resources (food, water, habitat) that explain association to riparian areas.

Project Status

Initiation date: FY 91
Scheduled completion date: FY 96

PUBLICATIONS None

COPE REPORT ARTICLES None

The Role and Management of Large Woody Debris for Fish Habitat in Coast Range Streams

(A. Skaugset, R. Rhew, OSU Adaptive **COPE**, B. Beschta, OSU Forest Engineering, G. Reeves, & J. Sedell, PNW Corvallis)

Study Objectives

- Synthesize current information relative to the abundance, distribution, and composition of large woody debris and fish populations in Oregon Coast Range streams of varying size and management history.
- Quantify the relationship between quantity and quality of large woody debris and its suitability as habitat for juvenile salmonids.

Project Status

Initiation date: FY 89
Scheduled completion date: FY 92

PUBLICATIONS

McMahon, T.E. & G.F. Hartman. 1989. Influence of cover complexity and current velocity on winter habitat use by juvenile coho salmon (Oncorhynchus kisutch). Canadian Journal of Fisheries and Aquatic Science 46(9):1551-1557.

COPE REPORT ARTICLES

McMahon, T.E. & R. Rhew. 1991. A large woody debris database for Coast Range streams. **COPE** Report 4(3): 2-5.

McMahon, T.E. & R. Rhew. 1989. Large woody debris and fish habitat in Coast Range streams. **COPE** Report 2(3):-4.

Establishment and Growth of Conifers Under Existing Riparian Vegetation

(G. Tucker, & S. McConnell, OSU Adaptive **COPE**, M. Newton, OSU Forest Science M. Cloughesy, Douglas County Extension, & R. Duddles, Coos County Extension)

Study Objectives

- Determine if native conifers can become established in existing alder and/or salmonberry stands normally found in riparian zones, with manipulation of the existing vegetation.
- Determine the degree of vegetation manipulation and maintenance resulting in the best growth of underplanted conifer seedlings.

Project Status

Initiation date: FY 89
Scheduled completion date: FY 96

PUBLICATIONS None

COPE REPORT ARTICLES

Bacon, C. 1989. Active management to establish conifers in alder-dominated riparian zones. **COPE** Report 2(3):4-5.

McConnell, S. & G. Tucker. 1991. Underplanting conifers in riparian forests: first year results. **COPE** Report 4(2):2-4.

Active Management of Riparian Zones for Multiple Resources: I. An Integrated Approach

(G. Tucker, A. Hansen, & A. Skaugset, OSU Adaptive **COPE**)

Study Objectives

- Identify studies to test various management strategies for protecting and enhancing fish and wildlife habitat and for promoting tree establishment and growth in riparian areas.
- Coordinate and facilitate interaction among active riparian management studies with regard to conceptual approach, study design, and data analyses.
- Integrate results from individual studies developed under the first objective in order to evaluate alternative approaches for actively managing riparian areas for the benefit of multiple resources.
- Identify opportunities to demonstrate state-of-the-art practices for maintaining and improving fish and wildlife habitats and for increasing tree development and growth in riparian areas.

Project Status

Initiation date: FY 90
Scheduled completion date: FY 96

PUBLICATIONS None

COPE REPORT ARTICLES

Bacon, C. & A. Hansen. 1988. Review of first **COPE** workshop on integrated resource management. **COPE** Report 1(4):2-3.

Hansen, A. & J. Petersen. 1989. Forest patterns and upland wildlife communities: An Adaptive **COPE** study. **COPE** Report 2(1):3-4

Hansen, A., J. Petersen, & E. Horvath. 1990. Do wildlife species respond to stand and edge type in managed forests of the Oregon Coast Range? **COPE** Report 3(2):3-4.

McMahon, T. 1990. Riparian management workshop review. **COPE** Report 3(3):2-3.

<<< >>>

Active Management of Riparian Zones for Multiple Resources: II. Release of Suppressed and Intermediate Conifers in Alder-Dominated Riparian Zones of the Oregon Coast Range

(G. Tucker, S. McConnell & D. Bateman, OSU Adaptive **COPE**)

Study Objectives

- Determine whether suppressed and intermediate conifers can be successfully released by manipulating overtopping vegetation.
- Determine the characteristics of understory conifers that are best correlated with their response to release.
- Determine the manipulations of overtopping vegetation that are best correlated with understory conifers response to release.
- Provide land managers with easily measurable features (both seedling and stand characteristics) from which the success of release operations may be predicted.

Project Status

Initiation date: FY 90
Scheduled completion date: FY 96

PUBLICATIONS None

COPE REPORT ARTICLES

McConnell, S. & C. Bacon. 1989. Active management of riparian zones for multiple resources: release of understory conifers. **COPE** Report 2(4):2-4.

Active Management of Riparian Zones for Multiple Resources: III. Influence of Woody Debris Piece Size on Function in Small Streams

(A. Skaugset, R. Rhew, J. Schroeder, OSU Adaptive **COPE**
J. Sedell, PNW Corvallis, & B. Bilby, Weyerhaeuser Corp.)

Study Objectives

- Determine the relationship of debris piece size and orientation to debris stability, pool configuration, sediment storage, and fish habitat quantity and quality in small streams.

Project Status

Initiation date: FY 90
Scheduled completion date: FY 98

PUBLICATIONS None

COPE REPORT ARTICLES

McMahon, T. & R. Rhew. 1989. Large woody debris and fish habitat in Coast Range streams. **COPE** Report 2(3):2-4.

Skaugset, A.E., J. Schroeder, & R. Rhew. 1991. The influence of large woody debris piece size and orientation on function in small streams: First-year results. **COPE** Report 4(2):4-6.

Stability Assessment of End-Haul Disposal Areas

(A. Skaugset, & J. Schroeder, OSU Adaptive **COPE**, M. Pyles, OSU Forest Engineering, D. Michael, K. Mills & J. Seward, Oregon Department of Forestry)

Study Objectives

- Develop a procedure to determine the location and then rank the stability of potential end-haul disposal areas at a basin scale.
- Develop a procedure to assess the relative and/or absolute stability of end-haul disposal areas on a site specific scale.
- Validate the above set of procedures by implementing them in field case studies on basin and site specific scales.

Project Status

Initiation date: FY 90
Scheduled completion date: FY 94

PUBLICATIONS None

COPE REPORT ARTICLES None

REFORESTATION

IN THE OREGON COAST RANGE

Completed Studies

Prescribed Fire in Pacific Northwest Forests: An Analysis

(J. Walstad, OSU Forest Resources, S. Radosevich, OSU Forest Science & D. Sandberg, PNW Corvallis)

Study Objectives

- Summarize what is known about fire and prescribed burning in Pacific Northwest forests.
- Interpret what it means from the standpoint of:
  - -Significance of available information
  - -Degree of scientific uncertainty and data gaps
  - -Relevancy to current issues
- Provide recommendations for decision makers to consider in formulating policies and actions concerning prescribed burning.

Project Status

Initiation date: FY 87
Completion date: FY 89

PUBLICATIONS

Walstad, J.D., S.R. Radosevich, & D.V. Sandberg, editors. 1990. Natural and prescribed fire in Pacific Northwest forests. Oregon State University Press, Corvallis, OR. 317 p.

COPE REPORT ARTICLES

Walstad, J.D. 1988. Prescribed fire in Pacific Northwest forests. **COPE** Report 1(1):27-28.

The Effect of Slash Burning on the Number and Distribution of Planting Spots and Planting Productivity on Sites in the Oregon Coast Range

(J. Zasada, B. Stein, PNW Corvallis, & J. Tappeiner, OSU Forest Resources)

Study Objectives

- Provide foresters with a method to quantitatively assess the relationship between fuel loading and planting productivity.
- Determine the relationship between fuel loading and the density and distribution of planting spots.

Project Status

Initiation date: FY 87
Completion date: FY 89

PUBLICATIONS None

COPE REPORT ARTICLES

Zasada, J. & J. Tappeiner. 1988. Effect of slash-burning on planting spot availability and planting efficiency. **COPE** Report 1(2): 5.

Reducing Air Pollution From Hardwood Conversion Burning in Coastal Oregon

(D. Sandberg, PNW Corvallis, R. Ottmar, PNW Olympia, & C. Hardy, PNW Seattle)

Study Objectives

- Explore techniques of slash burning that reduce air pollutant emissions, and develop methods that verify the reduction.
- Reduce emissions by burning uncured fuels.
- Reduce emissions through mass ignition.
- Measure the difference between coniferous and hardwood smoke.
- Develop inventory techniques for coastal hardwood fuel beds.

Project Status

Initiation date: FY 87
Completion date: FY 89

PUBLICATIONS None

COPE REPORT ARTICLES

Ottmar, R. & H. Colin. 1990. Reducing air pollution from prescribed burning. **COPE** Report 3(1):5-7.

A Diagnostic Tool for Predicting the Effects of Interspecific Competition on Growth and Yield of Douglas-Fir

(S. Radosevich & M. Newton, OSU Forest Science)

Study Objectives

- Develop a biomathematical model capable of simulating the growth of young (1- to 20-year-old) Douglas-fir stands as a function of site factors, tree and stand characteristics, and level of interspecific competition.
- Determine threshold levels of interspecific competition with Douglas-fir for each competitor type using the biomathematical model so that appropriate management decisions concerning site selection, control practices, and expected returns can be quantified.

Project Status

Initiation date: FY 88
Completion date: FY 90

PUBLICATIONS

Knowe, S.A., & R.G. Shula. 1991. A stand table projection system for young Douglas-fir plantations. CRAFTS Technical Report, Forest Research Laboratory, Oregon State University, Corvallis. 12p.

Knowe, S.A., T.B. Harrington, & R.G. Shula. 1992. Incorporating the effects of interspecific competition and vegetation management treatments into diameter distribution models for Douglas-fir saplings. Can.J. For. Res. (in press).

Knowe, S.A., & R.G. Shula. Stand- and tree-level approaches to modeling the effects of interspecific competition on early growth and development of Douglas-fir plantations. IN: Proceedings for the International Conference on Forest Vegetation Management, Auburn, AL. April 1992.

Opalach, D., R.G. Wagner, B.D. Maxwell, J.M. Dukes, Jr., & S.R. Radosevich. 1990. A growth model for young Douglas-fir stands: Progress report No. 2. CRAFTS Technical Report, Forest Research Laboratory, Oregon State University, Corvallis. 54 p. + diskette.

Opalach, D. & S.R. Radosevich. 1988. A progress report on a growth model for young Douglas-fir stands. CRAFTS Technical Report, Forest Research Laboratory, Oregon State University, Corvallis. 22 p.

Opalach, D., R.G. Wagner, B.D. Maxwell, J.H. Dukes, Jr., & S.R. Radosevich. 1988. A simulation model of competing Douglas-fir and salmonberry. Presented at the IUFRO Forest Simulation Systems Conference, Berkeley, CA, November 2-5, 1988.

Shula, R.G. & S.A. Knowe. 1991. Regional Vegetation Management Model: Recommended data matrix, and sampling and data collection protocols. CRAFTS Technical Report, Forest Research Laboratory, Oregon State University, Corvallis. 15p.

Shula, R.G. & S.A. Knowe. 1992. Regional Vegetation Management Model: revised dataset matrix, and sampling and data collection protocols. CRAFTS Technical Report, Forest Research Laboratory, Oregon State University, Corvallis, 5 p.

COPE REPORT ARTICLES

Opalach, D. & S.R. Radosevich. 1988. Modeling the growth of Douglas-fir and competing hardwood and shrub vegetation. **COPE** Report 1(3): 2-4.

Shula, R.G. & S.A. Knowe. 1991. Modeling competition effects in young stands: an update. **COPE** Report 4(1):6-7.

Environment and the Natural Regeneration of Conifers

(D. Minore, PNW Corvallis)

Study Objectives

- Identify sites and vegetation types in coastal Oregon where planting is not needed to obtain successful conifer regeneration within five years of harvesting when adequate seed sources are present.
- Identify sites and vegetation types in coastal Oregon where planting is needed to obtain successful conifer regeneration within five years of harvesting regardless of seed source.
- Define and describe adequate seed sources for obtaining successful natural regeneration in suitable environments.
- Define and describe the riparian environments that are most suitable for natural forest regeneration.

Project Status

Initiation date: FY 88
Completion date: FY 90

PUBLICATIONS

Minore, D. & H. Weatherly. Natural conifer regeneration and environment in coastal Oregon. submitted to: Western Journal of Applied Forestry.

COPE REPORT ARTICLES

Minore, D. 1988. The natural regeneration of conifers and environment. **COPE** Report 1(4):6-7.

Effects of Time of Manual Cutting on Resprouting of Salmonberry

(J. Zasada, PNW Corvallis)

Study Objectives

- Determine the effect of time of manual treatment on the rate of and spatial distribution of salmonberry resprouting and relate this response to easily observed phenological events.
- Relate phenology of shoot and leaf development to changes in the concentration of nonstructural carbohydrates in the rhizome system.
- Determine if salmonberry in burned and unburned clear-cuts responds differently to manual treatment.
- Determine the effect of season on sprouting potential of rhizomes.

Project Status

Initiation date: FY 89
Completion date: FY 90

PUBLICATIONS

Zasada, J., J. Tappeiner, B. Maxwell, & D. Temple, 1990. Salmonberry clone and stand structure and response to disturbance. Vegetation Management: An Integrated Approach - Proc. 4th Annual Vegetation Management Workshop. BC Forest Service/ Forestry Canada. FRDA Report 109. p. 51-52.

COPE REPORT ARTICLES

Zasada, J. J. Tappeiner, & B. Maxwell, 1989. Manual cutting of salmonberry or which bud's for you? **COPE** Report 2(2): 7-9.

Zasada, J. & J. Tappeiner. 1991. Understory treatment of salmonberry. **COPE** Report 4(2):10-11.

REFORESTATION

IN THE OREGON COAST RANGE

Continuing Studies

Ecology and Management of Shrubs and Hardwoods in Coastal Forests

(J. Tappeiner, OSU Forest Resources, J. Zasada, PNW Corvallis, & S. Radosevich, OSU Forest Science)

Study Objectives

Develop guidelines and techniques for managing the major shrub and hardwood species in the forests of coastal Oregon by:

- relating their potential rates of vegetative reproduction to the size and vigor of their aerial and/or underground parts.
- determining the effect of common silvicultural treatments (logging, burning, cutting) on vigor and spatial distribution of vegetation reproduction.
- determining their rates of reproduction and growth from seed and sprouts in a range of environments common in clear-cuts and in young and old-growth stands.

Project Status

Initiation date:	FY 87
Scheduled completion date:	FY 95

PUBLICATIONS

Haeussler, S. 1987. Germination and first year survival of red alder seedlings in the Central Coast Range of Oregon. M.S. Thesis. Corvallis, OR: Dept. of Forest Science, Oregon State University. 105 p.

Maxwell, B. 1990. The population dynamics and growth of salmonberry and thimbleberry. Ph.D. Thesis. Corvallis, OR: Oregon State University. . 286 p.

Maxwell, B. & S. Radosevich. 1988. A modeling approach to vegetation management. In: Proceedings, British Columbia Vegetation Management Workshop 3. FROA Report 026:80.

Tappeiner, J., J. Zasada, P. Ryan, & M. Newton. Salmonberry clonal population structure in Oregon forests: the basis for a persistent cover. Ecology. 72: p. 609-618.

Zasada, J., J. Tappeiner, B. Maxwell, & D. Temple. 1990. Salmonberry clone and stand structure, and response to disturbance in the Oregon Coast Range. In: E. Hamilton (compiler). Proceedings of the Fourth Annual Vegetation Management Workshop; November 14-16, 1989; Vancouver, B.C. Poster summary.

Zasada, J. & J. Tappeiner. 1990. Viability of bigleaf maple seeds after storage. Western Journal of Applied Forestry 5(4):52-55.

Zasada, J., J. Tappeiner, & M. O'Neil. 1991. Clone structure of salmonberry and vine maple in the Oregon Coast Range. Proceeding's of symposium on riparian zone vegetation. Sun Valley, ID. May 29-31, 1991.

COPE REPORT ARTICLES

Tappeiner, J. & J. Zasada. 1988. Ecology and management of shrubs and hardwoods in Oregon's Coast range forests. **COPE** Report 1(4):3-4.

Characterization of the Thermal Environment for Developing Guidelines to Manage Shrubs and Hardwoods in Coastal Forests

(R. Ottmar, PNW Olympia)

Study Objectives

- Characterize the humus layer and soil environment (depth of heat penetration, intensity, and duration) from broadcast burns in coastal forests.
- Develop a thermodynamic heat transfer model based on the relationship between woody fuel load, humus load, live vegetation load, lighting method, fuel moisture, soil moisture, and soil heat transfer properties.

Project Status

Initiation date:	FY 87
Scheduled completion date:	FY 93

PUBLICATIONS None

COPE REPORT ARTICLES

Ottmar, R. 1988. Characterization of the duff and soil thermal environment during broadcast burns in coastal forests of Oregon. **COPE** Report 1(4):4-6.

Second Decade Effects of Site Preparation on Tree and Vegetation Development With and Without Precommercial Thinning

(W. Stein, P. Owston, & J. Zasada, PNW Corvallis)

Study Objectives

Determine the extended effects of reforestation practices on the growth of trees and associated vegetation with or without precommercial thinning:

- Comparing tree survival and growth during the second decade following different site preparation treatments.
- Determining changes in vegetative cover, height, and animal use as conifers close crowns with or without precommercial thinning.
- Quantifying the effects of precommercial thinning on stand growth, vegetative development, and animal use.

Project Status

Initiation date: FY 89
Scheduled completion date: FY 96

PUBLICATIONS

Stein, W.I. 1990. The coastal reforestation systems study: comparing alternatives. In: Hamilton, Evelyn (compiler). Vegetation management: an integrated approach--Proceedings for the Fourth Annual Vegetation Management Workshop. 1989 November 14-16, Vancouver, B.C. FRDA Report 109, Victoria, B.C.: B.C. Ministry of Forests. p. 61-62.

Stein, W.I. 1990. Site preparation on coastal sites. In: Hamilton, Evelyn, (compiler). Vegetation management: an integrated approach--Proceedings of the Fourth Annual Vegetation Management Workshop. 1989 November 14-16, Vancouver, B.C. FRDA Report 109, Victoria, B.C.: B.C. Ministry of Forests. p.63-64.

COPE REPORT ARTICLES

Stein, W. 1989. Duration of site preparation effects. **COPE** Report 2(3):7-8.

Species Manipulation as a Strategy to Reduce the Impact of Laminated Root Rot in Regenerated Coastal Stands

(W. Thies, PNW Corvallis)

Study Objectives

- Identify the relative susceptibility of coastal Oregon conifers to laminated root rot.
- Determine if the number of nonsymptomatic-diseased trees in a stand is correlated to the number of symptomatic trees.
- Measure the minimum inoculum size that can cause seedling mortality.
- Determine if the size and condition of stumps left on the site can be successfully used to predict seedling mortality due to laminated root rot in the regenerated stand.

Project Status

Initiation date: FY 89
Scheduled completion date: FY 96

PUBLICATIONS None

COPE REPORT ARTICLES None

Asymbiotic Nitrogen Fixation in Large Woody Residues of Oregon Coastal Forests

(C.Y. Li, R. Crawford, & R. Molina, PNW Corvallis)

Study Objectives

- To provide baseline information on the amount of nitrogen fixation by free living bacteria in large woody debris on the forest floor before and after tree harvest.
- To determine the influence of mycorrhiza on nitrogen fixation rates in large woody debris in coastal Oregon forests.
- To provide information to reforestation specialists on the impact of large woody debris removal on long-term nitrogen economy of Oregon coast forests.

Project Status

Initiation date: FY 89
Scheduled completion date: FY 92

PUBLICATIONS None

COPE REPORT ARTICLES None

Characterization of Trichoderma spp.: Prelude to Biological Control

(E. Nelson, PNW Corvallis)

Study Objectives

- Collect and identify Trichoderma spp. associated with root pathogens.
- Characterize isolates using isozyme analyses and related technology.
- Test promising isolates for biological control potential.

Project Status

Initiation date: FY 90
Scheduled completion date: FY 94

PUBLICATIONS None

COPE REPORT ARTICLES None

Rate of Spread of Phellinus weirii in Living vs Dead Root Systems

(E. Nelson, PNW Corvallis)

Study Objectives

- To determine if development of P. weirii is restricted in root systems of harvested trees.

Project Status

Initiation date: FY 90
Scheduled completion date: FY 94

PUBLICATIONS None

COPE REPORT ARTICLES None

Chemical Control of Phellinus (Poria) weirii Part III-- Application of Chloropicrin or Methyl Isothiocyanate

(W. Thies, PNW Corvallis)

Study Objectives

- Determine if either healthy or diseased (P. weirii infested) Douglas-fir can survive injection with chloropicrin or MITC at dosages approaching those previously shown to eradicate P. weirii from stumps.
- Determine the residual P. weirii in the stump and roots of Douglas-fir receiving sublethal dosages of fumigant.
- For those trees that die as a result of injecting the fumigants, determine if the fumigant eradicated P. weirii from the stump and root system.
- At sublethal dosages, determine the impact of infection with chloropicrin on MITC on diameter growth of non-infected and infected trees.

Project Status

Initiation date: FY 90
Scheduled completion date: FY 93

PUBLICATIONS None

COPE REPORT ARTICLES None

The Influence of Tree Vigor on Infestation of Douglas-fir by Phellinus weirii

(E. Hansen, OSU Botany & Plant Pathology,
W. Thies, PNW Corvallis, & E. Goheen, U.S. Forest Service, Portland)

Study Objectives

- Determine if tree vigor as influenced by inter-tree competition, affects susceptibility to laminated root rot.
- Determine if seedling vigor as affected by light and nutrient availability, affects susceptibility to laminated root rot.

Project Status

Initiation date: FY 90
Scheduled completion date: FY 92

PUBLICATIONS None

COPE REPORT ARTICLES None

Identification of Potential Brush and Hardwood Problem Sites

(D. Minore, PNW Corvallis)

Study Objectives

- Describe and measure areas on which unusually intensive vegetation management is required to control shrubs and hardwoods that compete with conifer regeneration after timber harvest, stratifying the areas by site preparation treatment.
- Describe and measure areas on which little vegetation management is required to control the shrubs and hardwoods that compete with conifer regeneration after timber harvest, stratifying the areas by site preparation treatment.

- Correlate important preharvest site characteristics with the range of postharvest shrub and hardwood competition identified under objectives one and two.
- Formulate a preharvest identification key to potential postharvest shrub and hardwood problems.

Project Status

Initiation date: FY 90
Scheduled completion date: FY 94

PUBLICATIONS None

COPE REPORT ARTICLES None

A Synthesis of Reforestation Practices with Constraints on Fire and Herbicides

(G. Tucker, S. McConnell, OSU Adaptive **COPE**, & S. Hobbs, OSU Forest Science)

Study Objectives

- Synthesize current information on vegetation management and reforestation strategies and treatments, with constraints on fire and herbicides, that are applicable to the Oregon Coast Range.
- From this synthesis, develop a study prospectus to test a specific hypothesis on the use of alternative vegetation management or reforestation techniques.

Project Status

Initiation date: FY 89
Scheduled completion date: FY 92

PUBLICATIONS None

COPE REPORT ARTICLES

Bacon, C. & S. McConnell. 1989. Alternatives to treatment with fire and herbicides: A synthesis of reforestation techniques. **COPE** Report 2(2):3-4.

McConnell, S. & C. Bacon. 1989. Active management of riparian zones for multiple resources: Release of understory conifers. **COPE** Report 2(4):2-4.

Patterns of Wildlife Abundance and Diversity in Managed Upland Forest Landscapes

(A. Hansen, OSU Adaptive **COPE**)

Study Objectives

- Determine patterns of wildlife abundance and associations with vegetation in three prevalent forest stand types: managed, open-canopy plantations (2-8 yrs old); managed closed-canopy plantations (25-30 yrs old); and mature natural stands.
- Quantify wildlife community characteristics and habitats along a gradient from stand edges to stand interiors.
- Determine the distribution of stand types, stand sizes, edge types, and edge lengths across the study area using aerial photograph interpretation.

Project Status

Initiation date: FY 89
Scheduled completion date: FY 92

PUBLICATIONS

Hansen, A.J., T. Spies, F. Swanson, & J. Ohmann. 1991. Lessons from natural forests: Implications for conserving biodiversity in managed forests. Bio Science 41(3):382-392.

Hansen, A.J. & D.L. Urban. Avian response to landscape pattern: The role of species life histories. Landscape Ecology. In Press.

COPE REPORT ARTICLES

Hansen, A.J. & J. Peterson. 1989. Forest patterns and upland wildlife communities: An Adaptive **COPE** study. **COPE** Report 2(1):3-4.

Hansen, A.J. 1989. Wildlife diversity and landscape patterns in Northwest Coastal Forests. **COPE** Report 2(3):5.

Hansen, A.J. 1990. Wildlife workshop summary. **COPE** Report 3(1):4-5.

Hansen, A.J., J. Peterson, & E. Horvath. 1990. Do wildlife species respond to stand and edge type in managed forests of the Oregon Coast Range? **COPE** Report 3(2)3-4.

<<< >>>

Adaptation of a Forest Succession and Wildlife Habitat Model to Managed Coast Range Forests

(A. Hansen, S. Garman, OSU Adaptive **COPE**, B. McComb, OSU Forest Science, M. Raphael, PNW Olympia, D. Urban, University of Virginia, & B. Noon, PSW Arcata)

Study Objectives

- Adapt FORET/ZELIG, a widely used stand simulation model, to Oregon Coast Range conditions.
- Develop a wildlife habitat subroutine that classifies model output in terms of suitability as wildlife habitat.
- Validate the model by comparing simulation results to actual field data for tree and shrub performance and wildlife habitat characteristics in managed plantations and natural stands in the Drift Creek Basin.
- Use the model to predict: long-term Douglas-fir growth rates under various levels of animal damage; and wildlife habitat characteristics of plantations under various silvicultural treatments.

Project Status

Initiation date: FY 90
Scheduled completion date: FY 93

PUBLICATIONS

Hansen, A.J., D. Urban, & B. Marks. In Press. Avian community dynamics: The interplay of landscape trajectories and species life histories. In A.J. Hansen & F. di Castri, editors. Landscape Boundaries: Consequences for Biotic Diversity and Ecological Flows. Springer-Verlag Ecological Studies Series, New York.

COPE REPORT ARTICLES

Hansen, A.J. & J. Peterson. 1989. Forest patterns and upland wildlife communities: An Adaptive **COPE** study. **COPE** Report 2(1):3-4.

<<< >>>

Effects of Forage Seeding on Establishment and Growth of Douglas-fir Seedlings

(T. Harrington, OSU Forest Science,
G. Tucker, & S. McConnell, OSU Adaptive **COPE**)

Study Objectives

- Quantify the effect of a range of grass-legume forage seeding mixes on the establishment and growth of Douglas-fir seedlings.
- Determine the relative competitive ability of natural vs. forage-seeded herbaceous communities.
- Determine the extent to which forage seeding reduces the invasion and growth of the natural woody and herbaceous competitors of Douglas-fir.
- Determine the growth response of Douglas-fir to herbaceous weed control treatments applied at different plantation ages.

Project Status

Initiation date: FY 90
Scheduled completion date: FY 97

COPE participation discontinued in 1992; Project continuing under the OSU CRAFTS Program.

PUBLICATIONS

Loucks, D.M. & T.B. Harrington. 1991. Herbaceous vegetation in forests of the western United States. Forest Research Laboratory, Oregon State University, Corvallis, 104 p.

COPE REPORT ARTICLES None

<<< >>>

NEW RESEARCH

INITIATED

FY 1992

The Utilization of Unconstrained Stream Reaches by Salmonids in the Oregon Coast Range

(G. Reeves & J. Sedell PNW Corvallis)

Study Objectives

- Synthesize data from the Oregon Coast Range which encompasses channel reach types. Specifically the proportion of broad valley flats and their relative utilization by salmonids.

Project Status

Initiation date: FY 92
Scheduled completion date: FY 94

Evaluation of Anadromous Salmonid Habitat Restoration Program on Schooner Creek, Hebo Ranger District, Siuslaw National Forest

(J. Sedell & G. Reeves, PNW Corvallis)

Study Objectives

- Document and quantify physical changes in summer and winter habitats for steelhead trout, coastal cutthroat trout, coho salmon, and chinook salmon resulting from habitat rehabilitation in the South Fork of Schooner Creek.
- Quantify response of juvenile anadromous salmonids to changes in summer and winter habitat.
- Quantify changes in smolt production resulting from habitat rehabilitation.
- Quantify numbers and species of adult salmonids returning to the South Fork of Schooner Creek.
- Evaluate the cost-effectiveness of the overall rehabilitation program.

Project Status

Initiation date: FY 92
Scheduled completion date: FY 96

Harvesting in Headwater Basins for Alternative Silvicultural Prescriptions

(L. Kellogg, OSU Forest Engineering)

Study Objectives

- Identify the logging planning and layout requirements for a replicated set of experimental timber harvest treatments in headwater basins which represent a gradient of levels and/or spatial distributions of structural retention (live trees, snags, fallen trees).
- Identify and evaluate operational constraints of implementing harvest treatments relative to logging feasibility and human safety.
- Quantify logging production and costs associated with harvest treatments.

Project Status

Initiation date: FY 92
Scheduled completion date: FY 95

Strength Behavior of Forest Soils Under True Field Stresses

(R. Bell, Civil Engineering, W. Schroeder, OSU Engineering, & M. Pyles, OSU Forest Engineering)

Study Objectives

- Review published information on residual soils and soil strength theories and testing procedures especially as related to soils under low ambient stress levels.
- Design and construct strength testing apparatus and procedures for low stress testing and stress path control.
- Test laboratory prepared specimens under stress conditions that simulate actual stresses in steep forested or recently logged slopes.
- Test typical natural soils to obtain a preliminary evaluation of the range and variability of the controlling strength parameters.
- Document the equipment, procedures, and results and present results at **COPE** workshops and appropriate conferences.

Project Status

Initiation date: FY 92
Scheduled completion date: FY 95

Integrating and Managing Recreation with Other Resources

(P. Brown, OSU College of Forestry, G. Stankey, OSU Forest Resources, & R. Clark, PNW Portland)

Study Objectives

- Determine what is known about management of recreation relative to sustainability and to other resource uses.
- Develop a conceptual framework for understanding how recreation can be integrated with other resource uses.
- Develop guidelines for management of recreation which is integrated with other resource uses and which considers resource sustainability.

Project Status

Initiation date: FY 92
Scheduled completion date: FY 94

Socioeconomic Research Feasibility Study

(S. Daniels, OSU Forest Resources)

Study Objectives

- Inventory the existing research and development/assistance efforts related to the study region and issue.
- Determine the relevant geographic scale for considering socioeconomic issues in the Oregon Coast Range. (Can you understand the socioeconomics of coastal Oregon without understanding the region's relationship to the Willamette Valley populations?)
- Develop an information base and technology to access and incorporate expertise and values of local communities related to socioeconomic issues.
- Develop a set of potential research programs that address socioeconomic issues in the relevant region.
- Design a forum where researchers and various stakeholders could discuss the potential research programs and rank them in terms of feasibility or desirability.

Project Status

Initiation date: FY 92
Scheduled completion date: FY 92

Decision Support System for Reforestation in the Oregon Coast Range

(J. Zasada, P. Cunningham, PNW Corvallis,
S. Knowe, S. Radosevich, & T. Harrington, OSU Forest Science)

Study Objectives

- Compile and evaluate information available on biotic and abiotic factors (including pre- and post-harvest variables) affecting survival and early growth of conifer and hardwood regeneration. PNW scientists will take the lead in this objective.
- Develop an expert system for defining and evaluating reforestation alternatives for the Oregon Coast Range. OSU scientists will take the lead in this objective.

Project Status

Initiation date: FY 92
Scheduled completion date: FY 96

Interdisciplinary Research and Demonstration Area Project (IRDAP)

(G. Tucker, A. Skaugset, R. Rhew, A. Hansen, OSU Adaptive **COPE**)

Study Objectives

- Quantify the responses of selected forest resources to alternative silvicultural prescriptions in structurally-poor, young or mature forest stands in headwater basins in the Oregon Coast Range.
- Determine processes or mechanisms that underlie key responses.
- Quantify and evaluate operational constraints of implementing the harvest treatments relative to feasibility and economics.
- Provide sites that demonstrate the implementation of alternative silvicultural prescriptions for uplands and riparian zones in headwater basins.
- Synthesize the results to identify the ecological and operational consequences for multiple resources of the alternative prescriptions.

Project Status

Initiation date: FY 92
Scheduled completion date: FY 98

COPE COOPERATORS (1987-1991)

Federal Agencies

Bureau of Indian Affairs
Bureau of Land Management
Pacific Northwest Research Station
Siskiyou National Forest
Siuslaw National Forest
U.S. Fish and Wildlife Service

State Agencies

Department of Energy
Department of Fish and Wildlife
Department of Forestry
Department of Land Conservation and Development
Division of State Lands
Oregon State University

Oregon Counties

Benton
Clatsop
Coos
Curry
Douglas
Josephine
Lane
Lincoln
Polk
Tillamook
Washington
Yamhill

Industries

Bohemia, Incorporated
Boise Cascade Corporation
Champion International Corporation
Davidson Industries, Incorporated
Diamond B Lumber Company
Georgia-Pacific Corporation
Giustina Brothers Lumber and Plywood Company
Howard-Cooper Corporation
Hydraulic & Machine Services, Incorporated
International Paper Company
James River Company
Longview Fibre Company
McDonald Industries, Oregon, Incorporated
Papé Brothers, Incorporated
Roseburg Resources Company
Rosboro Lumber Company
Ross Corporation
RSG Forest Products, Incorporated
Smurfit Newsprint Corporation
Starker Forests, Incorporated
Stimson Lumber Company
Sun Studs, Incorporated
Three-G Lumber Company
Weyerhaeuser Company
Wheeler Manufacturing Company
Willamette Industries, Incorporated
Willamina Lumber Company

Other Associations

Oregon Small Woodland Association
Oregon Coastal Zone Management Association

Recycled
Paper